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## Test 875: Oliver 1850

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# NEBRASKA TRACTOR TEST 875 - OLIVER 1850 GASOLINE

The University of Nebraska Agricultural Experiment Station  
E. F. Frolik, Dean; H. H. Kramer, Director, Lincoln, Nebraska

## POWER TAKE-OFF PERFORMANCE

Hp	Crank- shaft speed rpm	Fuel Consumption		Hp-hr per gal	Temperature Degrees F			Barometer inches of Mercury
		Gal per hr	Lb per hp-hr		Cooling medium	Air wet bulb	Air dry bulb	
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours								
* 92.43	2400	7.701	0.519	12.00	176	56	75	29.305
VARYING POWER AND FUEL CONSUMPTION—TWO HOURS								
82.70	2526	7.311	0.551	11.31	175	57	77	.....
0.00	2627	2.897	.....	.....	163	56	75	.....
42.24	2579	5.102	0.753	8.28	169	56	75	.....
92.89	2401	7.725	0.518	12.02	176	57	76	.....
21.22	2594	3.995	1.173	5.31	165	57	75	.....
62.54	2545	6.252	0.623	10.00	173	56	75	.....
Av 50.27	2545	5.547	0.688	9.06	170	56	75	29.250

## DRAWBAR PERFORMANCE

Hp	Draw-bar pull lbs	Speed miles per hr	Crank-shaft speed rpm	Slip of drivers %	Fuel Consumption		Hp-hr per gal	Temp Degrees F			Barometer inches of Mercury
					Gal per hr	Lb per hp-hr		Cooling med	Air wet bulb	Air dry bulb	

## VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST

<b>Maximum Available Power—Two Hours—4th Gear Hydra-Power</b>											
76.66	7801	3.69	2401	8.59	7.797	0.634	9.83	178	39	43	29.060
<b>75% of Pull at Maximum Power—Ten Hours—4th Gear Hydra-Power</b>											
64.01	5992	4.01	2558	6.74	6.948	0.677	9.21	175	20	20	28.945
<b>50% of Pull at Maximum Power—Two Hours—4th Gear Hydra-Power</b>											
43.68	3950	4.15	2582	4.34	5.642	0.805	7.74	176	33	35	29.050

## MAXIMUM POWER WITH BALLAST

60.14	10675	2.11	2550	14.59	2nd Gear Hydra-Pwr	170	42	45	29.130
72.57	9771	2.79	2399	12.40	2nd Gear .....	168	42	46	29.130
73.53	9660	2.85	2403	12.40	3rd Gear Hydra-Pwr	168	42	46	29.130
77.56	7954	3.66	2406	9.38	4th Gear Hydra-Pwr	168	45	49	29.070
76.40	6999	4.09	2405	7.93	3rd Gear .....	176	45	49	29.070
75.89	5542	5.14	2400	6.43	4th Gear .....	173	45	49	29.070
77.65	4928	5.91	2399	5.80	5th Gear Hydra Pwr	178	45	49	29.070
76.15	3488	8.19	2402	4.23	5th Gear .....	178	45	49	29.070
76.51	2732	10.50	2405	3.27	6th Gear Hydra-Pwr	178	45	49	29.070
70.54	1825	14.49	2406	1.92	6th Gear .....	178	45	49	29.070

## MAXIMUM POWER WITHOUT BALLAST

73.18	7695	3.57	2491	14.95	4th Gear Hydra-Pwr	175	30	33	29.020
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## VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST 4th Gear Hydra-Power

Pounds pull	7954	8392	8791	8909	9149	9271	9414
Horsepower	77.56	72.98	66.97	59.72	52.54	43.97	35.92
Crankshaft speed rpm	2406	2158	1906	1683	1448	1202	968
Miles per hour	3.66	3.26	2.86	2.51	2.15	1.78	1.43
Slip of drivers %	9.38	9.96	10.73	10.98	11.36	11.85	11.85

## TIRES, BALLAST and WEIGHT

		With Ballast	Without Ballast
Rear tires	—No, size, ply & psi	Two 18.4-34; 8; 20	Two 18.4-34; 8; 16
	—Liquid	1175 lb each	None
	—Cast iron	1120 lb each	None
Front tires	—No, size, ply & psi	Two 7.50L-15; 8; 36	Two 7.50L-15; 8; 28
	—Liquid	None	None
	—Cast iron	220 lb each	None
Height of drawbar		21½ inches	22½ inches
Static weight	—Rear	10860 lb	6270 lb
	—Front	2930 lb	2490 lb
Total weight with operator		13965 lb	8935 lb

## Department of Agricultural Engineering

Dates of Test: NOVEMBER 12 TO NOVEMBER 24, 1964

Manufacturer: OLIVER CORPORATION, CHARLES CITY, IOWA

**FUEL, OIL and TIME** Fuel regular gasoline Octane No Motor 83.4 Research 91.8 (rating taken from oil company's typical inspection data) Specific gravity converted to 60°/60° 0.7487 Weight per gallon 6.233 lb Oil SAE 10W API service classification MS, DM To motor 2.375 gal Drained from motor 1.673 gal Transmission and final-drive lubricant SAE 80 Total time engine was operated 44 hours.

**ENGINE** Make Oliver gasoline Type 6 cylinder vertical Serial No 75924 Crankshaft mounted lengthwise Rated rpm 2400 Bore and stroke 3⅞" x 4¾" Compression ratio 8.5 to 1 Displacement 310 cu in Carburetor size 1½" Ignition system battery Cranking system 12-volt electric Lubrication pressure Air cleaner dry type with built-in precleaner and automatic dust unloader using replaceable paper element Oil filter full flow replaceable paper element Oil cooler engine coolant heat exchanger for Hydra-Power oil and radiator for hydraulic oil Fuel filter sediment bowl with screen Muffler was used Cooling medium temperature control thermostat.

**CHASSIS** Type Standard Serial No 147 585-099 Tread width rear 68" to 89½" front 60" to 84" Wheel base 109¼" Center of gravity (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 31.3" Vertical distance above roadway 35.4" Horizontal distance from center of rear wheel tread 0" to the right/left Hydraulic control system direct engine drive Transmission selective gear fixed ratio with partial range operator controlled power shifting Advertised speeds mph first 1.61 second 3.10 third 4.34 fourth 5.37 fifth 8.36 sixth 14.45 reverse 1.82 and 4.89 (using Hydra-Power drive) first 1.18 second 2.28 third 3.18 fourth 3.94 fifth 6.13 sixth 10.60 reverse 1.33 and 3.59 Clutch single plate dry disc operated by foot pedal Brakes triple disc operated by two foot pedals which can be locked Steering hydraulic with power assist Turning radius (on concrete surface with brake applied) right 155" left 155" (on concrete surface without brake) right 170" left 170" Turning space diameter (on concrete surface with brake applied) right 310" left 310" (on concrete surface without brake) right 350" left 350" Belt pulley 1035 rpm at 2400 engine rpm diam 11⅝" face 8¾" Belt Speed 3049 fpm Power take-off 549 or 984 rpm at 2400 engine rpm.

**REPAIRS and ADJUSTMENTS** No repairs or adjustments.

**REMARKS** The Varying Drawbar Pull and Travel Speed run was not completed as the engine misfired at 720 rpm while the tractor was pulling approximately 9000 pounds.

All test results were determined from observed data obtained in accordance with the SAE and ASAE test code.

First gear Hydra-power drive and first gear direct drive were not run as it was necessary to limit the pull in second gear Hydra-Power drive to avoid excessive wheel slippage.

We, the undersigned, certify that this is a true and correct report of official Tractor Test 875.

L. F. LARSEN

Engineer-in-Charge

L. W. HURLBUT, Chairman  
G. W. STEINBRUEGGE  
J. J. SULEK  
Board of Tractor Test Engineers

# EXPLANATION OF TEST REPORT

## GENERAL CONDITIONS

Each tractor is a production model equipped for common usage. Power consuming accessories can be disconnected only when it is convenient for the operator to do so in practice. Additional weight can be added as ballast if the manufacturer regularly supplies it for sale. The static tire loads and the inflation pressures must conform to recommendations in the Tire Standards published by the Society of Automotive Engineers.

## PREPARATION FOR PERFORMANCE RUNS

The engine crankcase is drained and refilled with a measured amount of new oil conforming to specifications in the operators manual. The fuel used and the maintenance operations must also conform to the published information delivered with the tractor. The tractor is then limbered-up for 12 hours on drawbar work in accordance with the manufacturer's published recommendations. The manufacturer's representative is present to make appropriate decisions regarding mechanical adjustments.

The tractor is equipped with approximately the amount of added ballast that is used during maximum drawbar tests. The tire tread-bar height must be at least 65% of new tread height prior to the maximum power run.

## BELT OR POWER TAKE-OFF PERFORMANCE

**Maximum Power and Fuel Consumption.** The manufacturer's representative makes carburetor, fuel pump, ignition and governor control settings which remain unchanged throughout all subsequent runs. The governor and the manually operated governor control lever is set to provide the high-idle speed specified by the manufacturer for maximum power. Maximum power is measured by connecting the belt pulley or the power take-off to a dynamometer. The dynamometer load is then gradually increased until the engine is operating at the rated speed specified by the manufacturer for maximum power. The corresponding fuel consumption is measured.

**Varying Power and Fuel Consumption.** Six different horsepower levels are used to show corresponding fuel consumption rates and how the governor causes the engine to react to the following changes in dynamometer load: 85% of the dynamometer torque at maximum power; minimum dynamometer torque,  $\frac{1}{2}$  the 85% torque; maximum power,  $\frac{1}{4}$  and  $\frac{3}{4}$  of the 85% torque. Since a tractor is generally subjected to varying loads the average of the results in this test serve well for predicting the fuel consumption of a tractor in general usage.

## DRAWBAR PERFORMANCE

All engine adjustments are the same as those used in the belt or power take-off tests. If the manufacturer specifies a different rated crankshaft speed for drawbar operations, then the position of the manually operated governor control is changed to provide the high-idle speed specified by the manufacturer in the operating instructions.

**Varying Power and Fuel Consumption With Ballast.** The varying power runs are made to show the effect of speed-control devices (engine, governor, automatic trans-

mission, etc.) on horsepower, speed and fuel consumption. These runs are made around the entire test course which has two 180 degree turns with a minimum radius of 50 feet. The drawbar pull is set at 3 different levels as follows: (1) as near to the pull at maximum power as possible and still have the tractor maintain the travel speed at maximum horsepower on the straight sections of the test course; (2) 75% of the pull at maximum power; and (3) 50% of the pull at maximum power. Prior to 1958, fuel consumption data (10 hour test) were shown only for the pull obtained at maximum power for tractors having torque converters and at 75% of the pull obtained at maximum power for gear-type tractors.

**Maximum Power with Ballast.** Maximum power is measured on straight level sections of the test course. Data are shown for not more than 12 different gears or travel speeds. Some gears or travel speeds may be omitted because of high slippage of the traction members or because the travel speed may exceed the safe-limit for the test course. The maximum safe speed for the Nebraska Test Course has been set at 15 miles per hour. The slippage limits have been set at 15% and 7% for pneumatic tires and steel tracks or lugs, respectively. Higher slippage gives widely varying results.

**Maximum Power Without Ballast.** All added ballast is removed from the tractor. The maximum drawbar power of the tractor is determined by the same procedure used for getting maximum power with ballast. The gear (or travel speed) is the same as that used in the 10-hour test.

**Varying Power and Travel Speed with Ballast.** Travel speeds corresponding to drawbar pulls beyond the maximum power range are obtained to show the "lugging ability" of the tractor. The run starts with the pull at maximum power; then additional drawbar pull is applied to cause decreasing speeds. The run is ended by one of three conditions: (1) maximum pull is obtained, (2) the maximum slippage limit is reached, or (3) some other operating limit is reached.

For additional information about the Nebraska Tractor Tests write to the Department of Agricultural Engineering, University of Nebraska, Lincoln, Nebraska.



Oliver 1850 Gasoline